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Air Force Studies & Analyses Agency



M&S Data in AFSAA Making the Interface

Data Applications Branch

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AFSAA

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graph TD; AFSAA[AFSAA] --> FA[Force Application]; AFSAA --> S[Support]; AFSAA --> FE[Force Enhancement];
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Force Application

Support

Force Enhancement

Provide senior Air Force leadership with quality analyses while fostering excellence in modeling and simulation.

STUDIES: Conduct studies and analyses, explore new concepts and provide expertise and advice to meet short-term and long-term requirements of our customers

MODELS: Acquire and manage models, simulations, data and computer architectures necessary to support the analysis effort

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PURPOSE

- AFSAA, as in all OR shops, must track data
- The purpose of this tutorial is to:
 - Describe a process to “Do Data”
 - A data management tool
 - A study management tool
- Show success and failures in “doing data”
- Show possible recovery to the failures
- Elicit responses, help and ideas

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Data Analysis Functions

- Accept data from diverse sources
- Track source data validation
- Let analysts track study history and data flow and certify data as adequate
- Automate common simulation tasks
- Common postprocessing of data for reports, analyses and input to other simulations

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Kinds of Data (Source & Model)

- Source data: Intel data, equipment characteristics data, location data
- Model specific data:
 - Data in formats to directly read into a model
 - Geospatial Data, Cartographic
 - C&C Data, to whom things talk
 - Equipment lists - as located
- Derived Data - Scenario & context sensitive

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Kinds of Data (Study Data)

- Study Specific data requirements
 - Study Plan data
 - System data required to make model run
 - Locations of data files to run model
 - History data (about the study)
 - Archives of data and study process as a whole

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AFSAA Automation Standards

- AFSAA standards are very pragmatic, if it works, study managers will use it
- If it takes too much time, the study managers will not use it
- Build a Data Study and Management tool (S&M Tool) that helps
- DoD standards for meta data are to be implemented inside that tool

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Data is Constant Problem

- Currently: Meta data is required
- Source data sets have meta data, but
 - Data managers extract meta data from source documentation
 - By inference from data or directly from documents, messages of clarification, and phone calls to data sources
 - Crucial to the data V&V process

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Source Data V&V

- Data V&V is a process, not an end point
- OR shops do not do intell validation
- Data is 'converted' and stored in RDBMS
- Data is 'verified' against source docs
 - Data & meta data questions are asked of the source
 - ER diagrams built if time permits (IDEF1X)

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Source Data V&V (Continued)

- Data is normalized as best as possible
- Data dictionary is created
- Data managers maintain source data
 - Formally audit subsequent changes
 - Keep archives of all source data received
 - Update
 - or add new source data

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Source Data V&V (Continued)

- Study & data managers meet to:
 - 'Validate' data with source documentation
 - Write an MFR stating the 'readiness' of the data for use
 - Data is ready to be 'pulled' for a study

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Source Data to Model Data

- Data conversions/pulls are discussed for particular studies
- Business rules (AKA)
 - transform algorithms
 - data conversion process
 - source-to-model equations
 - data filters
- Model data input files are 'verified' against model documentation

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Model Data V&V - Source Data to Model Data

- Model and study managers write filters
- Model, study managers
 - V&V data conversion processes
 - Certify the conversion and the results
- Data are put into study area with filters

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Data Certification Source to Model

- Users certify the data is adequate
- Users track changes in study data
- Study management process
 - 'DIARY' tool to document changes
 - 'HISTORY' tool to track study progress
 - 'ARCHIVE' tool to archive study any time

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Current Tool's Problems

- New Model integration ambiguous
- Data structure currently too confining
- Work on developing new features is time consuming

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Implementation Guideline (no change)

- Incremental graphical approach
- Create data management process
- Avoid making model changes to implement the data management processes
- Allow analysts as much control as possible

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MASTR II - A New Analysis

- Specification Document; Review
- Object Oriented Analysis; Review
- Object Oriented Design; Review
- Module Development; Review

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Interview the users: Data Side and Model Side

- Look at hardware and network capability
- Look at what processes need to be performed
- Find requirements from data users that need to be met

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Look at hardware and network capability

- Office is really using engineering workstations connected on a LAN
- Fiber Network capable of very high data rates
- Distributed set of data files, by model and study area and by office
- SUN, Silicon Graphics & 486/Pentium PCs, a very heterogeneous environment

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Study Analysts and library users require access to common data

- Study managers: publish study results?
- Library should access the study plans
 - Should hold & publish study results
- Scenario analysis using different models needs consistent 'starting point'
- Source data should be available faster for any scenario

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OBSERVATIONS

- Change, as a cultural issue, is a problem, need a good change agent
- MASTR works, but analysts too busy to use it; not yet well populated with data
- It is a 'pragmatic' approach
- Must find customers who need to store data, and capture data 'business rules' or transforms from data producers and users.

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